combinations, the properties of which and their appropriateness for particular cases were easily ascertainable.

Mr. Ellis, while deprecating the introduction generally of musical performances under the guise of lectures, illustrated his propositions by showing the effect of several instruments of fixed tones, concertinas and harmoniums, tuned in different ways. Some short harmonical passages were played, first on a harmonium of the ordinary kind, secondly on another with absolutely just intonation, and thirdly on a newly-constructed harmonium tuned on Handel's plan of the old organ temperament, but with the addition of several other notes enabling music to be played in all keys, equally well in tune. These additional notes were brought into use by draw-stops, each of which made an enharmonic change in one note, as from C sharp to D flat, G sharp to A flat, and so on. The stops were arranged before commencing the piece according to the key it was in, and they could be instantly altered at any time during its progress, if required by modulation. In this instrument the major thirds (the intervals to which the ear is most sensitive) were all justly in tune, but the fifths and minor thirds were a little flat; the ear, however, tolerated these slight errors much better than the extremely discordant error of the major third in equal temperament, and the effect of the harmony as played upon it was a great improvement on that plan.

Mr. Ellis, in the course of the paper, made frequent mention of the views of Helmholtz on harmony and temperament, and illustrated them by examples.

After the reading of the paper, Dr. Pole, F.R.S., remarked that Mr. Ellis's method of treating the elements of the musical scale had much originality, and had an interesting bearing on the structure of harmony generally; its principal object appeared, however, to be, in continuation of the author's former labours, to facilitate the production of correct intonation in music, an object of much importance. He would remind the meeting what was the present state of matters in regard to this. The fact was, that at present it was but seldom possible to hear what true harmony was like, as the great majority of music-producing instruments, namely, all those with fixed tones, were deliberately and systematically tuned false, with an amount of error painful to a sensitive ear. When he, a day or two ago, put his fingers on Mr. Ellis's just harmonium, he uttered an involuntary exclamation of surprise, for he had not heard the true harmony of a common chord for some time before. The public had only two opportunities of hearing true harmony: one when a stringed quartett was played by fine players; the other when a vocal unaccompanied piece was sung by first-rate singers. In each of these, the performers, being untrammelled by the odious temperament, gave way to the dictates of their correct ears, and produced true harmony. Every person of musical taste knew well the delightful impression produced by this kind of music. In modern oratorios it was very customary to insert, as in "Elijah," for example, an unaccompanied vocal piece, which was always rapturously applauded. Yet few people thought of the cause; it was not the composition, for the same music, when played on tempered instruments, was quite another thing; it was not even the skill of the performers, which could be manifested in other ways; it was purely and simply the fact of the harmonies being in tune, which was an agreeable novelty to the ear.

On the pianoforte, where the sounds were not long sustained, the errors of the temperament were not so offensive, but on instruments with sustained tones, such as the organ and harmonium, the defects were much more prominent. In olden times musicians had more sensitive ears, and organs were tuned (as Mr. Ellis had stated in regard to Handel's organ) on a temperament which put the principal keys in good tune, and threw the defects into keys seldom or never used on an organ in those days. But since that time, as modern music, and especially what the Germans called *Fingerfertigkeit*, had increased in popular favour, organists had made up their minds to play in all sorts of remote keys, and had demanded that the organ builders should favour this by applying the equal temperament. For show organs this course might be defended, but for church organs, where nothing was required but the use of the simplest keys, it was perfectly indefensible, as it was spoiling the tone of the organ for its ordinary use, for the sake of a purely imaginary want. The organ was half a century ago a sweet-sounding instrument; now it was a harsh, offensive one, which made attendance at church a penance to persons with musically sensitive ears. A curious proof occurred a few years ago as to the mischief the equal temperament did to the tone of an organ. Dr. Pole had to superintend the construction of two organs of tolerable size: in one he was obliged to give way to popular prejudice by having it tuned equally; in the other he pleased himself by adopting the old tuning; and although the instruments were precisely alike in other respects, and made by the same builder, the latter acquired the reputation of a peculiarly sweet-toned organ, while the former was considered a harsh tone.

It was time something was done to correct the evil, but there had been difficulties both theoretical and practical. Theoretically it had been difficult to determine what should be the exact pitch and number of the notes to be used, but he conceived Mr. Ellis had now exhausted that subject, and that for the future no person who wished to carry out plans of just intonation would find difficulty in selecting from Mr. Ellis's data, exactly such *duodenes*, or series of notes, as would answer his purpose. There were still difficulties in practice, for as it was certain that more notes than twelve must be used, the problem how to enable the player to arrange them easily was not an easy one. In this particular, however, progress was being made; Mr. Ellis had pointed out several important simplifications, and Dr. Pole especially looked on the harmonium with shifting tones now exhibited as a promising invention. It was pleasant to hope there was some practical possibility of getting music in tune.

The continued discussion of the subject of just intonation was very desirable, for the reason that practical musicians, probably from a feeling of hopelessness as to getting anything better, were beginning to consider equal temperament as a necessary evil, and to look upon its harshness with indifference. Indeed, it was to be feared that the ears of musicians were becoming actually deteriorated in sensitiveness to errors of intonation. In our best orchestras, for example, although the strings might play in tune (for our orchestral violinists had no superiors in the world), yet the wind instruments were often false; and our conductors, even the best of them, seemed callous to the cacophony. He might remark here that the efforts at producing just intonation had been hitherto confined to instruments with the pianoforte keyboard, but there was a wide field open for the improvement in this respect of orchestral wind instruments, in regard to the just intonation of which absolutely nothing had yet been done. The utmost wind instrument makers had aimed at was to make them play correctly on equal temperament; he was not aware that anybody had thought it worth while to make enharmonic distinctions in their scale.

On all these accounts Mr. Ellis's labours to improve the general knowledge of the subject were most valuable, and earned for him the gratitude of all true lovers of music.

THE TREE-ALOES OF SOUTH AFRICA

THE flora of Southern Africa is extremely remarkable, not merely for the number of its species and their generally very restricted range, but also for the frequent singularity of their aspect and manner of growth. In

each of these particulars the genus *Aloe* is no exception to the general rule. Many of the species are well known in cultivation, but all agree in having fleshy elongated evergreen leaves, and thick erect spikes of yellow or red flowers. Medicinally, many species (and possibly all might be) are of importance as yielding a well-known bitter drug, which is simply the juice exuded from the leaves when cut, and boiled down to a solid consistence.

The species of *Aloe* are probably only really indigenous in Southern and Eastern Africa. *A. vulgaris* is now, however, found widely distributed along the Mediterranean and in the East and West Indies, where it is cultivated as the source of the Barbados and Curaçoa aloes.* *A. indica*, Royle, is doubtless a slight variety. Dr. Stewart mentions it as being occasionally cultivated throughout the Punjâb, and says that the pulp of the leaves is eaten by poor people and in famines.† According to the same writer, the Aloe mentioned by Masson in the Punjâb is a palm (*Chamærops Ritchiana*).‡ *A. littoralis*, König, found at Cape Comorin, is believed to be a form of *A. vulgaris*, altered by the circumstances of its situation. The habit of growth in the genus varies considerably. Mrs. Barber, a well-known South African naturalist, gives the following account of the part they play in the physiognomy of the native vegetation :—

"The genus *Aloe*, Linn., has a wide range in this country, its numerous species occurring in all rocky localities throughout the land ; wherever rocks are found there are the Aloes also, cropping out (if I may be allowed the expression) with the geological formations of the country, as if they formed a part of them, decorating each knoll and cliff with their gay blossoms in great profusion and variety, from the gigantic Aloe of the Transkeian territory, which attains the height of sixty feet, and the tall, graceful, wood Aloes, to the sturdy, stout-built Aloe of the cliff, and the minute lizard-tail-like species that are scattered among the grass, each filling its peculiar *locale*

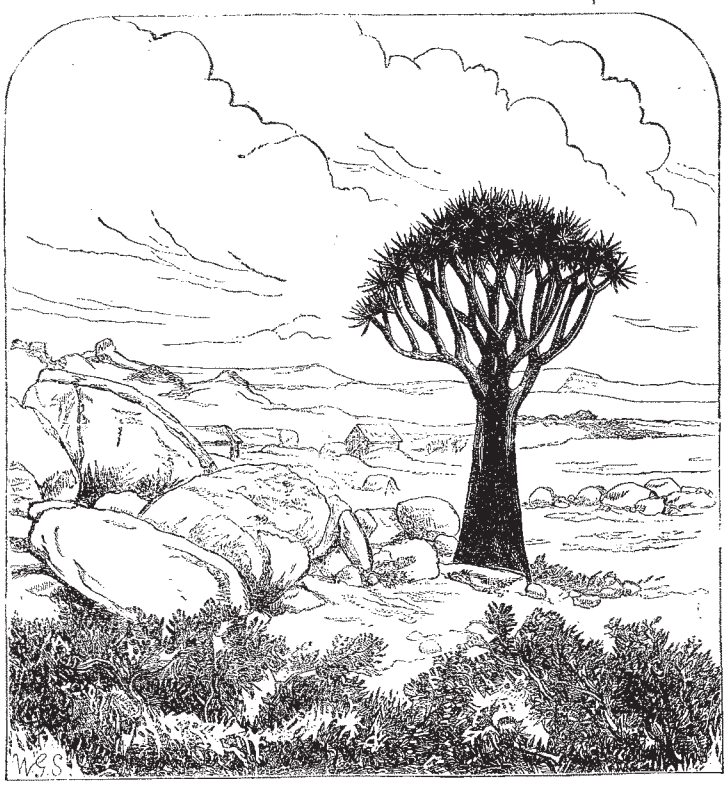

FIG. 1.—*Aloe dichotoma*, Linn., from Namaqualand.

FIG. 2.—*Aloe Barberæ*, Dyer, from Kaffraria.

to complete the character of the landscape, and to render it truly South African in appearance."§

It may be well to mention that the true Aloes of the Old World have nothing whatever to do with the so-called "American Aloe." This is a species of *Agave*, a genus indigenous to Mexico and South America. The habit of the two genera is in many respects curiously similar, and they afford a striking instance of "homoplasy"—of the assumption by organisms essentially differing in themselves, of externally similar forms, when exposed to similar external conditions. *Aloe* commonly flowers laterally, and the growth of its main axis is therefore not arrested ; *Agave*, as is generally known, flowers from its central bud, and consequently dies afterwards. *Aloe* is Liliaceous, with a superior ovary ; *Agave* is Amaryllidaceous, with an inferior one. But *Aloe*, as we have seen, has passed to the New World, and *Agave* is quite as much at home now in the Old World as its representatives are.

One is at first sight hardly prepared to hear of Aloes assuming the dimensions of trees. That they do so is, however, quite certain, though our knowledge of the arborescent species was, till quite lately, extremely imperfect, and is, indeed, still far from complete. I collected together all the material I could get access to in a paper published in the *Gardener's Chronicle* for May 2 of this year. My present object, besides that of calling the attention of the readers of NATURE to these very remarkable plants, is to correct a rather important error into which I find that I have fallen respecting them.

In point of fact, it is now pretty clear that the west and east coasts of South Africa each possess one endemic Tree-Aloe. That of the west, where it is distributed from Walvisch Bay to Clanwilliam, is *Aloe dichotoma*, Linn.

* Flückiger and Hanbury's "Pharmacographia," p. 616.
† "Punjâb Plants," p. 232. ‡ Loc. cit., p. 242.
§ Journ. Roy. Hort. Soc. New Series, vol. ii. p. 80.

well described in Paterson's "Travels in Africa" (1789), but otherwise very little known. The present Governor of the Cape, Sir Henry Barkly, has made great exertions to procure plants for Kew, and two have now arrived in this country, the largest being 8 ft. in height, but there is some doubt whether either will eventually survive the voyage.

Aloe dichotoma appears to attain a height of about 30 ft., with a girt of about 12 ft.* Fig. 1 is from a photograph by Mr. Chapman, and is reproduced from the *Gardener's Chronicle*. Young plants of the Aloe from Kaffraria, alluded to above by Mrs. Barber, are now in cultivation at Kew. Finding that the name by which it was known belonged to another species, *A. Zeyheri*, and that it was undescribed, I renamed it *Aloe Barberæ*, in honour of Mrs. Barber, who first sent cuttings of it to this country. Fig. 2 (which is also borrowed from the *Gardener's Chronicle*) is a copy of a rough sketch sent to this country by the Rev. R. Baur, a Moravian missionary, at present

FIG. 3.—*Aloe Barberæ*, Dyer, from Natal.

resident in Kaffraria. He speaks of it as growing in the forests to the height of 30 ft., with a girt three feet above the ground of about 16 ft. Its dimensions are therefore about the same as those of *Aloe dichotoma*. In Mr. Baur's sketch the seed-vessels are represented, and he feared that he had made them proportionately too large.

An arborescent Aloe also exists in Natal. An account of this from Mr. Baines, the well-known African traveller, with a sketch of the spot where the plants occurred, was sent to Dr. Hooker with a living branch during last year. It was the subject of a communication made to the British Association at Bradford.† The appearance of the branch of the Natal plant was so different from that of the Kaffrarian, that I ventured to characterise it as a new species under the name of *Aloe Bainesii*, on the ground that the leaves were longer, not glaucous, and not so completely crowded into a terminal tuft. The fact of the leaves being crowded into a terminal rosette, or spaced down the stem, is found to afford a character of even sectional value among the species. I was therefore rather astonished to find that when the Natal plant had fairly established itself, its rosette of leaves began to grow out. It is apparently only in old plants that the leaves are crowded into rosettes. I do not now doubt that the Kew plant of the Natal Aloe will eventually assume quite the same appearance as plants of the Kaffrarian one, with which I am now disposed to believe it to be identical. The name *A. Bainesii* must therefore be merged as a synonym in *A. Barberæ*. The only remaining discrepancy is with respect to the flowers. Mr. Baines believes that those of his plant were orange or scarlet. Those of the Kaffrarian plant (ample specimens of which I have recently received through the kindness of Sir Henry Barkly) appear, from a sketch made by Lady Barkly, to be rose, passing into flesh-colour.

The sketch of *A. Barberæ* from Natal (Fig. 3) is from a drawing by Mr. Sanderson, of D'Urban.

The stems of these Aloes must necessarily increase "exogenously" in diameter. This, no doubt, takes place in the same way as in the well-known Dragon Tree (*Dracæna Draco*).

W. T. THISELTON DYER

* By an unfortunate misprint in the *Gardener's Chronicle* (copied by Flückiger and Hanbury, *loc. cit.*), 30 ft. is given as the greatest girt.

† See *Journal of Botany*, 1873, p. 348. The sketch is reproduced in the *Gardener's Chronicle*, loc. cit.

TRANSACTIONS AND PROCEEDINGS OF THE ROYAL SOCIETY OF VICTORIA

WE have received the Proceedings of the Royal Society of Victoria for the years 1870, 1871, and 1872, the issue of which has been delayed by the withdrawal of the Government grant in 1868, but through the liberality of the present Government we are glad to hear that the financial state of the Society enables the present report to be printed. We have read with great pleasure the addresses of the president, Mr. Ellery, showing that scientific knowledge is gaining ground fast in Victoria. Mr. Ellery tells us of the work at the Observatory, and that the positions of 38,305 stars have been established up to 1870. In 1868 the great reflector of 4 ft. diameter was mounted, and Mr. Ellery says that although his hopes were not fully realised, the telescope, if it does not excel, equals every other of its size. Mr. Le Sueur appears to have attacked η Argus and its surrounding nebula as early as possible, and in February 1870 he informs the Society that the spectrum of η is crossed by bright lines corresponding to *C D E F* and one beyond *F*, probably *Hy* : the principal line of nitrogen was also seen. He therefore concludes that hydrogen, nitrogen, sodium, and magnesium are indicated. No dark lines seem to have been seen with certainty, although they were suspected. Mr. Le Sueur says : "We seem driven to the conclusion that the star consists of a solid nucleus, a gaseous envelope cooler than the nucleus producing the dark lines, and a second envelope hotter than the nucleus accounting for the bright ones." We hope we shall not be quite driven to this conclusion of a solid nucleus, which seems highly improbable. A large influx of hot hydrogen or nitrogen from the nebula or other source might be sufficient to reverse the dark lines, and as this would heat the original photosphere more intensely its absorption would be reduced, accounting for the reduction in intensity of the black lines. In January 1874 we find that Mr. Macgeorge examined this star and found no bright lines, and further, that a distinct nebulosity surrounded the star, which in December 1869 appeared, according to Le Sueur, on a black background. Mr. Macgeorge furnishes several drawings of the nebula surrounding η which show a vast change in the shape of the mass. In 1838 η was involved in dense nebula, while